SCIENCE

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HIGHER EDUCATION OF WOMEN.[1]

I HAVE often expressed surprise, and sometimes indignation, that citizens of a State which possesses two great universities — Columbia and Cornell — should so often decide to send their children to the universities of other States — to Harvard, or Yale, or Princeton. Apart from special preferences or personal associations with one or the other university, the parent often claims that absence from home is essential to the complete education of a boy. This proposition is, I think, open to much dispute. But it becomes still more assailable when applied to the education of girls.

It seems to me that the origin of this idea, as of so many others that claim a logical basis, is really an historical tradition, derived from conditions of life in England, where the youth to be educated were chiefly recruited from families scattered through the country, and who must therefore necessarily leave home in order to acquire a university training. In England also originated the idea that to "make a man of a boy," he must be thrown young into the often brutal public life of the great public schools, and in tender years be consigned to a rough-and-tumble existence, because in mature life this was what he would be expected to lead.

The feminine counterpart to the boys' public school was the young ladies' boarding-school. Here the girl was expected to acquire manners and finish, as there the boy was expected to learn manliness. Intellectual considerations had little to do with the choice in either case.

If we throw aside the subtle influence of tradition, and state clearly the reasons which should incline parents to send their daughters away from home to be educated, it is easier to note where these reasons may still hold in modern times and where they have become invalid.

Evidently, to share the privileges of a university, it is necessary to be a resident of a university town, so that nonresidence in such a town becomes an imperative reason in favor of sending girls away from home, if it be once decided that they are to have this training. Again, if a family is consciously and avowedly on a lower plane of intelligence, education, or refinement than that to which it is desired that the daughters shall attain, it may again be necessary to remove the latter entirely into a different sphere of life and thought, while their minds and characters are being moulded.

Or, again, it may be desired to educate girls rather against their will, as is so often the case with boys, and therefore considered best to remove them into a special atmosphere, there they shall be uninfluenced by family or social disfunctions, where, as the phrase is, "they shall have more systematic training." This might happen for younger girls, whose older sisters were going out into society.

Admitting that these considerations may all become imparative in certain cases, it remains true, however, that they must always be enforced against counter considerations of such strength as often justly lead parents to forego a college education for their girls altogether, rather than incur the risks of sending them away from home.

Whatever may be the use or abuse of a gregarious life for boys and young men, there can be no doubt that it involves great risks for adolescent girls. All the voluminous literature that has been written on the dangers of "coeducation" for girls really applies to gregarious education with members of their own sex. A girl thrown into a mass of several hundred other students, is subjected to a constant nervous strain, which, indeed, may be borne by the robust and healthy, but to which the nervous and delicate too often succumb. The physical evil of such massive association is beginning to be recognized, and combated by the device of substituting smaller groups of students in isolated homes or cottages, for the vast dormitories of the earlier colleges, which resembled magnified models of the old-fashioned boarding-schools. Still it remains true that a girl placed in an army of her fellows is in a position peculiarly foreign to her nature, which demands — possibly merely from the influence of immemorial inheritance and tradition — an individual setting, a family life. "It is natural," Goethe says somewhere, "for boys to wear uniforms: it is equally unnatural for girls to do so, for they are not destined to live or act in masses, but each is to be the centre of a home."

Thus a girl who is living at home, or who, in default of that, is living in a private family while attending lectures at a university, is running counter to no traditional organic habits of sex, whether her fellow-students be all girls, or whether the classes be mixed. But if she be removed to an institution, she is placed to that extent in the unfavorable conditions common to the monastery, the nunnery, and the orphan asylum. These unfavorable influences may, of course, be resisted, and are so in many cases, but they are always theoretically unfavorable, and not favorable, as is often claimed; and on that account certainly should not be encountered except under pressure of absolute necessity.

"The systematic training," which consists in shutting up a girl exclusively in one set of ideas, horizons, and pursuits for three or four years, is again a disadvantage and not an adyantage. The great thing that youth requires, and that female youth requires especially, is change, change of thought, scene, interest, frequent and absolute relaxation of tension. It is perfectly understood that in boys' colleges this imperative need of complete change is apt to be met, not only by innocent though boisterous recreation, but often also by far from innocent dissipation. A young man has been expected to "sow his wild oats" at college coincidently with the seed from which he hopes to reap a satisfactory harvest. But girls are too docile, too unenterprising, for these violent reactions. They have less innate force of reaction, and thus a greater tendency to adjust themselves to the exact temperature of their surroundings. It is desirable, therefore, that their surroundings should not be of a uniform character, but rather varied, accidents, such indeed as are offered by the daily incidents of family life.

The intellectual life of the university should, wherever practicable, be blended with this family life. When it is shut off from the latter, the four college years are dropped

[1] Dr. Mary Putnam-Jacobi, in the Evening Post.

like a solid isolated block into the life of the girl — we might say like a meteorite fallen from the sky. It is often felt that, when these college years are finished, everything connected with them is to come to an end, be set aside, the student herself is regarded as a finished product, turned off from a mysterious machine, to be henceforth separated from it as distinctly as a box from a turning-lathe.

All this habit of mind is again characteristically English — true English Philistinism, which is frankly indifferent to intellectual interest for its own sake — but accepts a prescribed intellectual drill as a means of attaining — it is not clearly apprehended what.

Removal of a girl from her mother's care, during the critical years of adolescence, must always be an evil morally and physically, even when it is an advantage intellectually. That is to say, it must be an evil, whenever the mother is adequate to her charge, which, of course, is only too often not the case. The girls are the exception whose health does not require constant and careful supervision, and it is absurd to expect such supervision from the girls themselves. A young person is a prig, who is competent, unadvised, to look after her own health. It is perfectly true that thousands of mothers prove themselves even more incompetent, either through indolence, or ignorance, or indifference. But, theoretically, we expect a mother to be watchful, well informed, far-sighted, and intensely solicitous. Such an anxious mother, if nervous, uneducated, and weak, may, indeed, do as much harm to the girl by over-fussing and spoiling as can the mother who is indifferent to the plainest laws of health; and the girl will do better, if removed to the impartial jurisdiction of a college faculty. But this is not then a change from good to better, but from worse to good by default.

The foregoing remarks have been suggested by surprise at the fact that relatively so few citizens of New York seem as yet to have become aware of the great advantage that has been brought to their doors by the foundation of the Barnard College for women in connection with Columbia University. Nearly half of the pupils thus far enrolled are not from New York City, but from without our gates,[1] and at the same time New York girls leave their homes every year for the colleges of other States — where they can only study under the disadvantages which have just been enumerated. Nay, more, these disadvantages are not counted as such, but on the contrary are reckoned as so many reasons for preferring the exile from home. For a quarter of a century the anomaly has existed that daughters of the wealthiest or the most highly educated citizens of the great city of New York have been deprived, except through such exile, of the educational advantages which were accessible to the inhabitants of a country town like Poughkeepsie. The parents must deprive themselves of the delight of a daughter's society during four of the most charming years of her life; or else deprive the girl of the "still air of those delightful studies" which should throw a charm over all her future life and lend a force to all her faculties. During four years all the marvellous development of thought and feeling which goes to the making of character, all the delicate details which go to the formation of manners, must proceed unwatched by the eyes that have the most intense interest in both, or else the babyish system of education must be continued, which arrests the intellectual training of a girl at the very point where, for a boy, it first begins to be strenuous. This injurious anomaly in our social structure was removed, or rather the first step was taken to remove it, when, in a measure, Columbia College opened its doors to women. Compared with what should be necessary when the girls of New York shall have come forward in proportionate numbers to claim the privileges of their university, the measure is slight and the beginning small. From this small beginning, however, a full university education for women cannot fail to grow so soon as the citizens of New York thoroughly appreciate, not only the value of such education, but the value of having its facilities at home, brought to their doors, when they realize that their girls may now claim their share in the intellectual inheritance of the race, without incurring the risks of expatriation from home which were already inherent in the boarding-schools of the sampler and crochet-needle, but are now too often laid to the account of a little Latin and less Greek.

[1] The Free Competitive Scholarship for the best entrance examination into the Freshman Class for the year 1890–91 was won by a graduate of the Jersey City High School.

CAN WE MAKE IT RAIN?[1]

The recent experiments in rain making in Texas, under direction of General Dyrenforth, and which have attracted the attention of the whole country, seem attended by a certain amount of success.

General Dyrenforth has proceeded upon the theory that heavy concussions in the upper air currents would cause a disturbance of these currents and thus produce rain. Consequently all his attempts have been to produce the greatest possible noise in the endeavor to cause a commingling of currents proper for a condensation of their moisture.

Every scientist knows, and a moment's thought ought to convince any one, that concussions cannot cause rain-fall. An explosion in the air is immediate in its effects. It becomes in fact merely the propagation of a sound-wave, which, travelling about eleven hundred feet in a second, has but an instantaneous action upon the air through which it passes, and in which it is gradually frittered away into heat. In a small part of a second the air is again the same in temperature and density. The greatest effect, then — the practical effect — must follow close upon the concussion. Therefore, if General Dyrenforth's tremendous explosions, his "air quakes," produced rain-falls in Texas, there should have been an immediate down-pour in that particular locality as a result of each explosion. But such was not the case. In every case, according to his statements, the rain has fallen from two to twenty-four hours after the explosions, and over extended areas. In a few instances, when rain-clouds were already present, General Dyrenforth says *drops* of rain fell within a few seconds after the explosions. The violent concussions may have had to do with the formation of these drops, but the true and only valuable rains came hours after every possible effect of the concussion had gone.

It is an observed fact that rains have followed the heavy cannonading of battles. But these rains did not fall until several hours after the concussions of the air had completely ceased. So, too, the proverbial showers of the Fourth of July come late in the afternoon or during the day following.

Further, it is noticeable that during a thunder-storm lightning-flash and its attendant thunder are usually accompanied by a sudden increase of rain downpour. This has been frequently attributed to the discharge of electricity in the clouds. But the increase and the flash occur so nealy simultaneously, that the rain-drops must have started from

[1] Since the above was presented before the University Science Cl Nov. 13, I have read with interest Mr. T. G. McPherson's excellent pre tion of Aitken's experiments on "Dust," in the Popular Science Month December, 1891.